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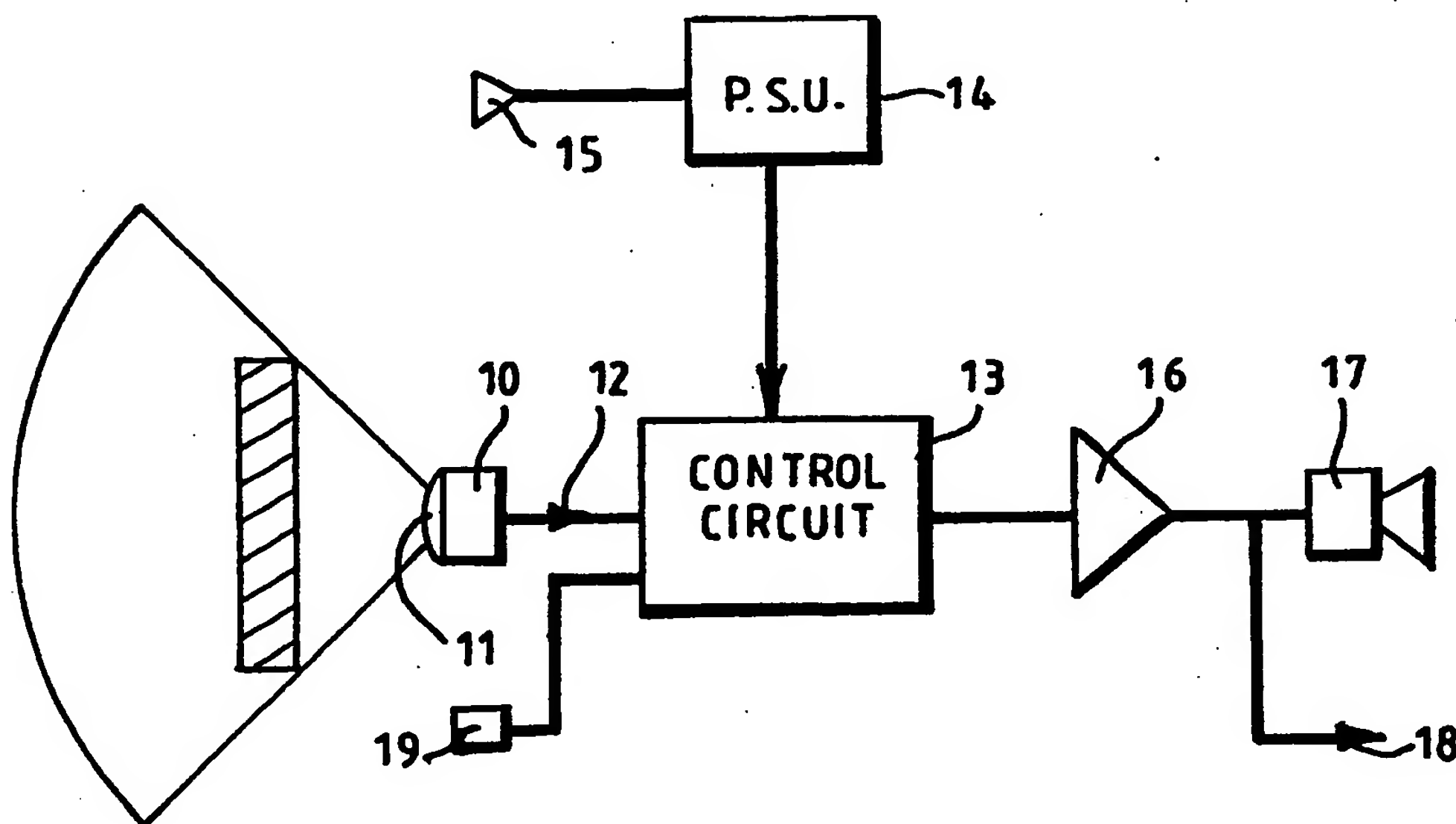
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(54) Audible alarms

(57) Alarm apparatus intended for protecting an area of water containing fish which may be preyed on by fishing birds comprises a passive infra-red detector 10 having a fan-shaped detection zone and adapted to respond to the presence of a bird in that zone. A sound transducer 17 is driven by a control circuit 13 triggered by the output of the detector 10, the control circuit initially producing a first drive signal to cause the transducer to issue a first kind of audible alarm signal, such as a simulated series of gun shots. Then, if the detector 10 output continues to trigger the control circuit after the lapse of a pre-set time interval, the control circuit produces a second drive signal to cause the transducer to issue a second kind of audible alarm signal, such as a simulated dog barking. This cycle may be repeated, or may include further simulated noises, until the detector no longer detects the presence of a bird.

FIG.1



At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1990.

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FIG.1

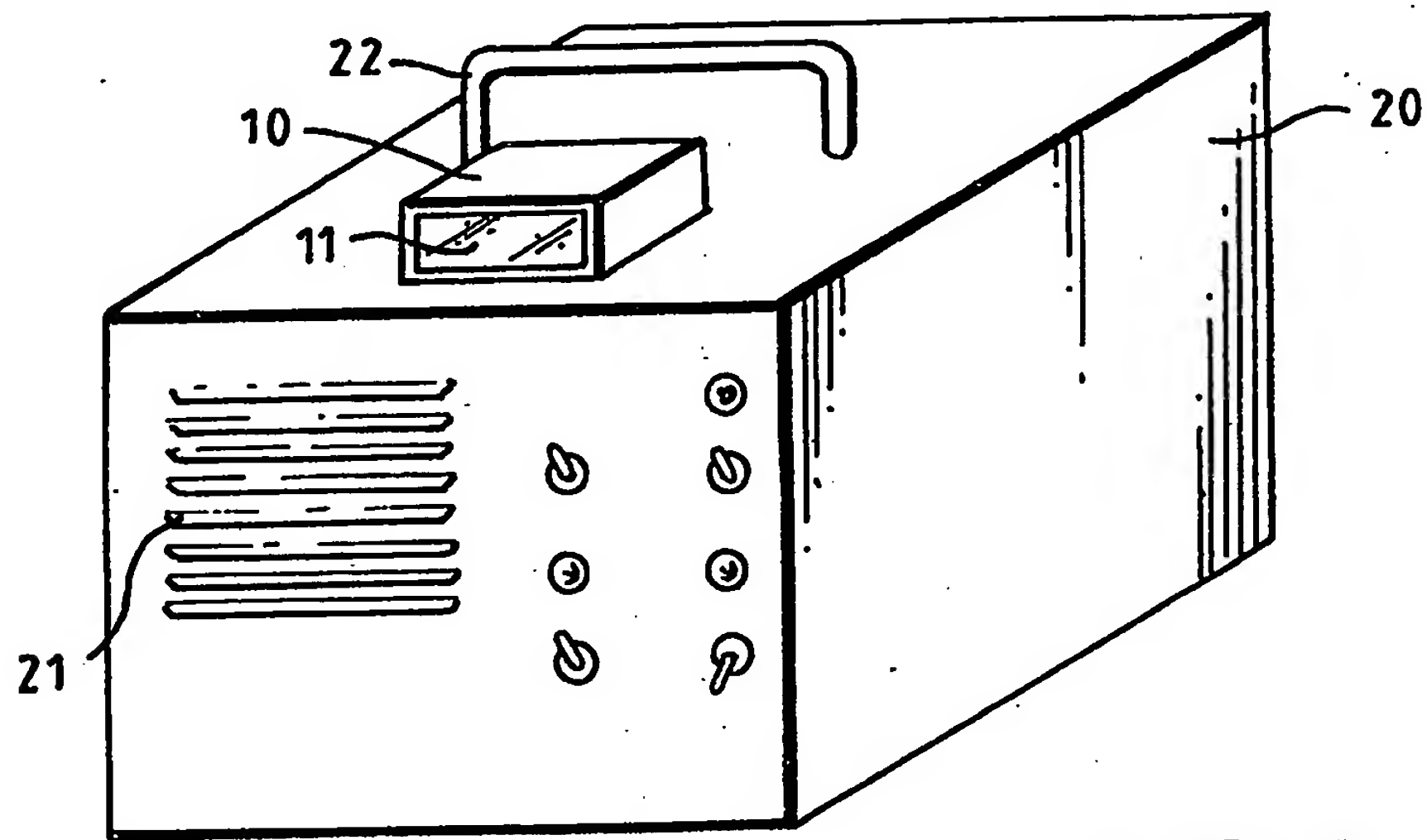
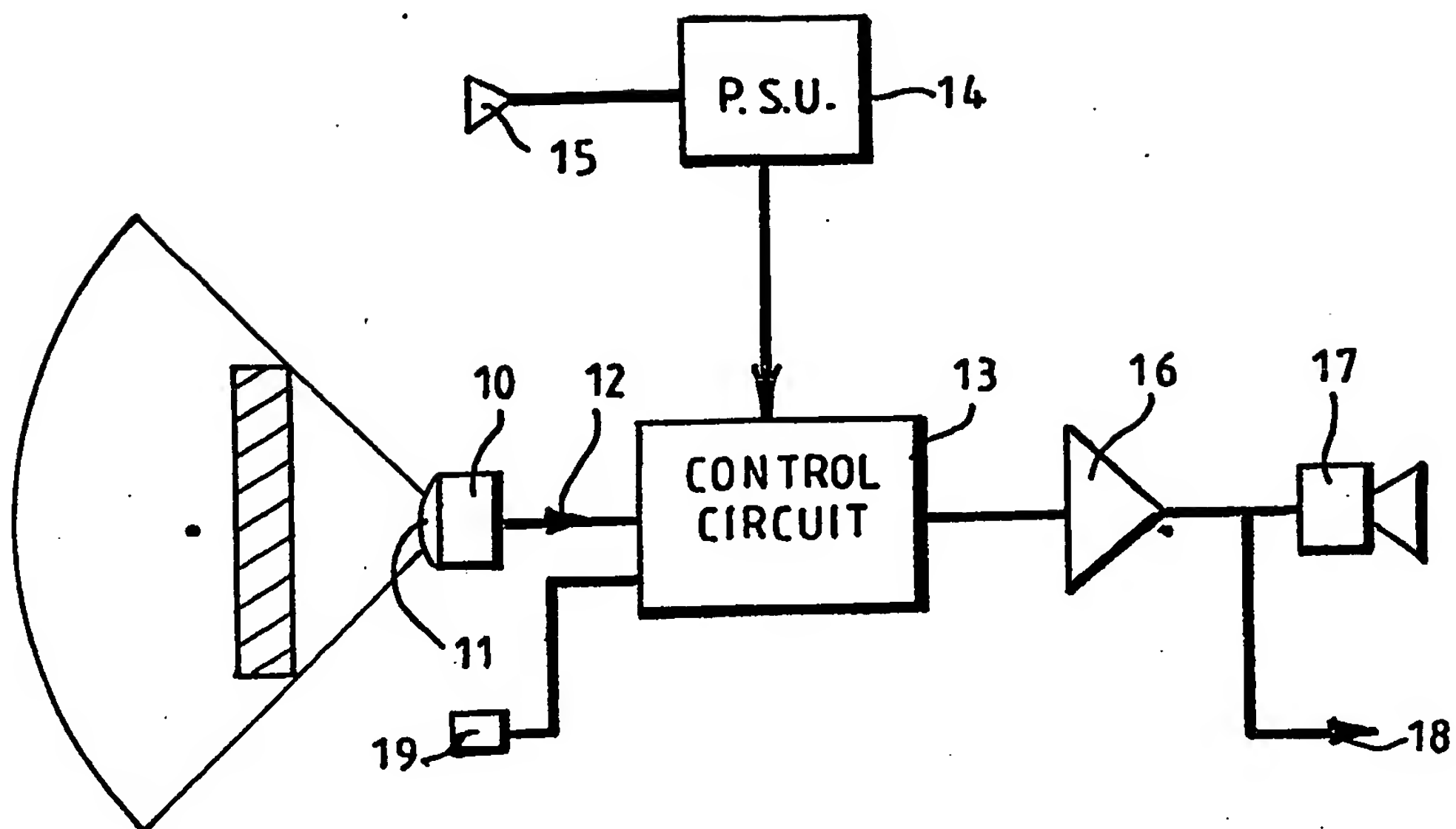


FIG.2

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AUDIBLE ALARMS

This invention relates to an audible alarm, and in particular - but not exclusively - to audible alarm apparatus suitable for use in scaring birds away from an area protected by the alarm apparatus.

5 Farmers often use bird scarers which generate loud noises at regular intervals, in an attempt to scare birds away from growing crops. Such scarers are of only limited efficacy, in that a noise is generated whether or not birds are present and, since a noise
10 cannot be generated continuously on environmental grounds, it is possible that the noise will be produced when no birds are present and yet no noise will be produced when birds are present. Also, such scarers cannot be used in sensitive areas, for example close to
15 regions of high population, for the repetitive noise will not be tolerated by people not involved in the farming operation.

A particular problem arises when fish-eating birds (hereinafter referred to as "fishing birds") are to be
20 scared away from ponds, lakes or the like containing valuable fish, especially since such ponds or lakes are often in populated regions. It is thus most important that no noise is produced other than when a fishing bird is present, but if the fish are adequately to be
25 protected, then a noise must be produced when the birds

are present. Also, since many fish jump out of the water by some relatively small distance, it is also important that the fish themselves will not falsely trigger the alarm.

5 It is a principal object of the present invention to provide audible alarm apparatus suitable for use as a bird scarer, particularly to protect an area of water from fishing birds.

10 Accordingly, this invention provides audible alarm apparatus comprising an electromagnetic radiation detector adapted to detect the movement of an animal within a sensed zone and to provide an output dependent thereon, a sound transducer which provides an audible alarm output on being driven by an electrical signal,
15 and a control circuit responsive to an output from the detector and providing an electrical signal to drive the transducer dependent thereon, the circuit being arranged to provide a first drive signal to cause the transducer to produce a first kind of audible alarm on
20 first responding to a detector output, and then to provide a second drive signal to cause the transducer to produce a second kind of audible alarm should the detector output causing the control circuit to respond continue for more than some pre-set time interval.

25 It will be appreciated that in the audible alarm apparatus of the present invention, an alarm is sounded only when a movement of an animal within a sensed zone

is detected. Then, a first audible alarm sound is produced, but should the animal still remain within the sensed zone for more than some pre-set time interval, the transducer will be driven to produce a second kind
5 of audible alarm sound, so increasing the likelihood of the animal being scared away by the alarm.

The audible alarm apparatus of this invention preferably is expressly configured so as to be suitable for protecting areas of water in which there are fish
10 and which may be preyed upon by fishing birds, such as herons. To this end, the detector preferably senses a fan-shaped detection zone, in plan, which should be of as great an arcuate extent as possible. Typically, the arcuate extent of that zone will be at least 75° , but
15 advantageously is of 90° , or even more.

Further to assist in the elimination of false alarms, it is highly preferred that the detection zone has a relatively narrow vertical extent. Typically, the detection zone should be less than 1 m high, and
20 preferably is as small as 0.5 m. For such a case, when the apparatus is being installed to protect an area of water from fishing birds, the apparatus should be disposed adjacent the area of water to be protected, with the detector sensing essentially lateral movements
25 within a vertical zone starting approximately 0.3 m above the water surface. This will minimise the likelihood of false alarms caused by the fish

themselves, and also by matter falling into the water.

Most conveniently, the detector comprises a passive infra-red (or thermal) detector of a known kind, but being provided with a lens or lens assembly specifically adapted to give the preferred sensing zone referred to above. An alternative type of detector may be an active infra-red detector, used in conjunction with one or more infra-red transmitters disposed either remote from the apparatus to direct a beam to the detector, or internal of the apparatus and the transmitted beam being reflected from suitably disposed mirrors, back to the detector. Of course, radiation other than that in the infra-red region may be used; for certain applications visible light may usefully be employed. When active detection is employed, the transmitted radiation may appropriately be modulated, in order to minimise the likelihood of false alarms which would otherwise be caused by sources of radiation falling within the same region of the spectrum.

The sound transducer may take any known form, and preferably comprises some kind of relatively high-powered loud-speaker. Bearing in mind the likely location of the apparatus, the loud-speaker should be water-proofed. It is also preferred for the loud-speaker to be relatively directional, and arranged to direct its sound output over the zone being monitored

by the detector.

The first and second kinds of audible alarm to be emitted by the apparatus should carefully be selected, having regard to the particular intended application
5 for the apparatus. In the case where the apparatus is to be used to scare fishing birds (such as herons) away from a pond, lake or the like, in order to protect the fish, the noises should be selected so as to be the most likely to scare away those birds. For example, in
10 a preferred embodiment of apparatus of this invention, the first kind of alarm comprises a series of simulated gun-shots, such as of three shot-gun explosions. If then the detector still detects the presence of the bird which initially triggered the alarm some pre-set
15 time interval later, the second kind of audible alarm should be emitted - and again, for this particular intended application of the apparatus, this second kind of audible alarm may be a simulated barking of a large dog. Of course, other kinds of alarm noises will
20 readily suggest themselves to those skilled in the art.

In the event that the detector still detects the presence of an animal following the emission of the second kind of alarm sound, the apparatus may then cycle through the first and second kinds of alarm until
25 no further animal presence is detected. Alternatively, the apparatus may emit third and even further kinds of audible sounds in sequence, each time a pre-set time

interval after the previous alarm, and then cycle again through the same sequence, until no further animal presence is detected.

5 The apparatus of this invention is preferably contained within a waterproof casing, to permit the apparatus to be located out-of-doors adjacent the area to be protected, such as on the side of a lake, or pond. Such apparatus may be wholly self-contained, and so fitted with internal batteries, such as rechargeable
10 Ni-Cad re-chargeable cells. Alternatively, or in addition to that, the apparatus may be arranged for connection to the domestic mains supply, or to some other internal or external power source such as a 12 volt car-type accumulator.

15 The apparatus may further be enhanced by including an automatic night-time detector, which serves automatically to disable the apparatus during the hours of darkness. This may be used to inhibit the emission of alarm sounds during anti-social hours, so minimising
20 the nuisance level of the alarm to neighbouring properties.

 The apparatus may further include a bright flashing light which is operated whenever the alarm is triggered by an animal. Such a light should be
25 directed across the monitored zone, and may increase the likelihood of an animal being scared away.

 By way of example only, one specific embodiment of

alarm apparatus constructed and arranged in accordance with this invention will now be described in detail, reference being made to the accompanying drawings, in which:-

5 Figure 1 is a block diagram of the apparatus; and
 Figure 2 is a sketch of a complete apparatus configured as a heron scarer.

Referring initially to Figure 1, it can be seen that apparatus of this invention comprises a passive
10 infra-red detector 10 of a generally known kind, but having a special lens 11 in front of its detection matrix (not shown) in order to give a detection zone of a predetermined shape. As shown, the detector 10 in combination with the lens 11 is able to detect thermal
15 changes within a generally fan-shaped zone of approximately 90° extent, but having a relatively narrow vertical band, typically of about 0.5 to 0.6 m high. In this respect, the detector and lens combination differs significantly from conventional
20 passive infra-red detectors, which ordinarily are configured to have a more-or-less conical detection zone, of about 45° included angle.

The passive infra-red detector provides an output signal 12 whenever it detects a thermal variation
25 within its detection zone of above some pre-set threshold value. This signal 12 is fed to a control circuit 13, supplied with power from a power supply

unit 14. The power supply unit may be wholly self-contained, and so for example may comprise a rechargeable battery pack, or it may include a connector 15 for an external electricity supply, the
5 power supply unit 14 then conditioning that supply so as to be suitable for feeding to the control circuit 13, and other components of the apparatus.

The apparatus further comprises a power amplifier 16 and a high-powered water-proof loud-speaker 17
10 driven by the amplifier 16. The amplifier also supplies output power to a connector 18, for an external loud-speaker.

The control circuit 13 includes electronic synthesisers arranged to produce electronic signals
15 which simulate the firing of a shot-gun, and of a large dog barking. The control circuit 13 is arranged to respond to the production of signal 12 so as initially to supply to the power amplifier 15 an audio signal of the sound of a shot-gun being fired, typically three
20 times, and then, if the detector signal 12 is still present some pre-set time interval following its commencement, to supply to the power amplifier 16 an audio signal simulating a dog barking. Then, if that signal 12 is still present a further pre-set time
25 interval later, the control circuit 13 once more produces a signal of simulated gun shots, and so on until the signal 12 no longer is produced.

Also shown in Figure 1 is a night-time detector 19, connected to the control circuit and which, when enabled, serves to inhibit operation of the alarm during the hours of darkness.

5 Figure 2 shows an example of apparatus of this invention assembled into a self-contained box ready for positioning adjacent a lake, pond or the like, and containing the components illustrated in Figure 1. This apparatus comprises a water proof plastics housing
10 20 having louvred vents 21 behind which is positioned the loud-speaker 17 (not shown in Figure 2). A handle 22 is provided on the upper surface of the housing 20, and also mounted on that upper surface is the passive infra-red detector 10, together with its lens 11. On
15 the front face of the housing 20, there are provided various switches and indicator lights, to control the apparatus and to advise a user concerning the operation.

 The detector 10 and lens 11 may instead be mounted
20 within the housing 20, a window being provided in the front face of the housing for the detector. Also, an electrical heater may be provided for the detector and lens, to prevent frosting of the lens so as to ensure its continued operation even at sub-zero temperatures.

25 In use, the apparatus is positioned beside a pond, lake or the like with the sensing zone of the detector 10 extending across the surface of the water, but

spaced therefrom by, typically, 0.5 - 0.6 m. Whenever the apparatus is operational, should an animal - such as a heron which ordinarily lands on the ground adjacent the pond and then walks horizontally into the pond to start fishing - move into the detection zone, the alarm will be triggered so that the loud-speaker initially emits a series of high-powered gun shot sounds. This should scare away the animal, but if the detector still detects the presence of that animal in the detection zone some pre-set time interval - and typically 30 seconds - later, then the alarm apparatus will emit the sound of a dog barking. This cycle of two different noises is repeated at pre-set time intervals, until the detector no longer detects the presence of the animal in the detection zone.

CLAIMS

1. Audible alarm apparatus comprising an electromagnetic radiation detector adapted to detect the movement of an animal within a sensed zone and to provide an output dependent thereon, a sound transducer
5 which provides an audible alarm output on being driven by an electrical signal, and a control circuit responsive to an output from the detector and providing an electrical signal to drive the transducer dependent thereon, the circuit being arranged to provide a first
10 drive signal to cause the transducer to produce a first kind of audible alarm on first responding to a detector output, and then to provide a second drive signal to cause the transducer to produce a second kind of audible alarm should the detector output causing the
15 control circuit to respond continue for more than some pre-set time interval.
2. Audible alarm apparatus according to claim 1, wherein the detector is adapted for protecting areas of water in which there are fish and which may be preyed
20 upon by fishing birds, the detector sensing a fan-shaped detection zone in plan.
3. Audible alarm apparatus according to claim 2, wherein the arcuate extent of the fan-shaped zone is at least 75°.
- 25 4. Audible alarm apparatus according to claim 3,

wherein the arcuate extent of the fan-shaped zone is at least 90°.

5. Audible alarm apparatus according to any of the preceding claims, wherein the detection zone has a
5 relatively narrow vertical extent.

6. Audible alarm apparatus according to claim 5, wherein the detection zone has a vertical extent of less than 1 m.

7. Audible alarm apparatus according to claim 6,
10 wherein the detection zone has a vertical extent of about 0.5 m.

8. Audible alarm apparatus according to any of the preceding claims, wherein the detector comprises a passive infra-red detector known per se, and provided
15 with a lens or lens assembly specifically adapted to give the required sensing zone pattern.

9. Audible alarm apparatus according to any of claims 1 to 7, wherein the detector comprises an active infra-red detector, one or more infra-red transmitters being
20 provided and which are disposed either remote from the apparatus to direct a beam to the detector, or internal of the apparatus to direct a beam for reflection from suitably disposed mirrors, back to the detector.

10. Audible alarm apparatus according to any of the
25 preceding claims, wherein the sound transducer comprises a high-powered directional loud-speaker.

11. Audible alarm apparatus according to any of the

preceding claims, wherein the first kind of alarm comprises a series of simulated gun-shots, and the second kind of alarm comprises a simulated barking of a large dog.

5 12. Audible alarm apparatus according to any of the preceding claims, wherein the control circuit is arranged to cause the apparatus to cycle through the first and second kinds of alarm in the event that the
10 detector still produces an output following the emission of the second kind of alarm sound until the detector no longer produces an output.

13. Audible alarm apparatus according to any of claims 1 to 11, wherein the control circuit is arranged to cause the transducer to produce third or even further
15 kinds of audible sounds in sequence, each time a pre-set time interval after the previous audible sound and then cycle again through the same sequence, until no further detector output is produced.

14. Audible alarm apparatus according to any of the
20 preceding claims, wherein the apparatus is contained within a waterproof casing.

15. Audible alarm apparatus according to claim 14, wherein the apparatus is wholly self-contained, and is fitted with internal batteries.

25 16. Audible alarm apparatus according to any of the preceding claims, wherein there is provided an automatic night-time detector, which serves

automatically to disable the apparatus during the hours of darkness.

17. Audible alarm apparatus according to any of the preceding claims, wherein there is provided a light
5 which is caused to flash whenever the detector produces an output.

18. Audible alarm apparatus according to claim 1 and substantially as hereinbefore described, with reference to and as illustrated in the accompanying drawings.

Patents Act 1977
aminer's report to the Comptroller under
Section 17 (The Search Report)

Application number

9107239.7

Relevant Technical fields

(i) UK CI (Edition K) A1E (EAH); G4N (NDAD)

(ii) Int CI (Edition 5) A01M; G08B

Databases (see over)

(i) UK Patent Office

(ii) WPI

Search Examiner

D L SUMMERHAYES

Date of Search

4 DECEMBER 1991

Documents considered relevant following a search in respect of claims 1-17

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
Y	GB 2235979 A (PRICE) see whole document	1, 2, 12, 13, 16 at least
X	GB 2203581 A (CHEN) see whole document	1 and 9 at least
Y	GB 2203581 A (CHEN) see whole document	2 at least
Y	2161974 A (SALTNEY) see whole document	1, 2, 11, 12, 13, 16 at least
Y	GB 1441618 A (SECURITY CONTROL) see whole document	1, 17 at least
Y	GB 1161559 A (CHUDY) see whole document	1 at least
X	US 3688293 A (SULLIVAN) see whole document	1 at least
Y	US 3683346 A (HORTON) see whole document	1 at least

Category	Identity of document and relevant passages	Relevant to claim(s)

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